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| Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information, and sending the information to the Department of Defense, Paperwork Reduction Project (0704-0188), Washington, DC 20503.   |  | PAGE<br><b>AD-A229 005</b>                                |  | Form Approved<br>OMB No. 0704-0188   |  |
| 1. Agency Use Only (Leave blank).   |  | 2. Report Date.<br>1990                                   |  | 3. Report Type and Dates Covered.<br>Abstract  |  |
| 4. Title and Subtitle.<br>The Corrosion Behavior of Copper-Based Materials Exposed to Natural Seawater  |  |   |  | 5. Funding Numbers.<br>61153N<br>Program Element No<br>03102<br>Project No<br>310<br>Task No<br>DN094463<br>Accession No |  |
| 6. Author(s).<br>B. Little, R. Ray, P. Wagner, F. Mansfeld, R. Teal, and H. Shih  |  |   |  |  |  |
| 7. Performing Organization Name(s) and Address(es).<br>Naval Oceanographic and Atmospheric Research Laboratory<br>Stennis Space Center, MS 39529-5004   |  |   |  | 8. Performing Organization Report Number.<br>AB 91:333:001   |  |
| 9. Sponsoring/Monitoring Agency Name(s) and Address(es).<br>Naval Oceanographic and Atmospheric Research Laboratory<br>Stennis Space Center, MS 39529-5004  |  |   |  | 10. Sponsoring/Monitoring Agency Report Number.<br>AB 91:333:001   |  |
| 11. Supplementary Notes.<br>The Electrochemical Society   |  |   |  |  |  |
| 12a. Distribution/Availability Statement.<br>Approved for public release; distribution is unlimited.  |  |   |  | 12b. Distribution Code.  |  |
| 13. Abstract (Maximum 200 words).<br>The corrosion behavior of Cu, Cu-Ni alloys, Admiralty Brass and Al Bronza has been studied as a function of exposure time to natural seawater at the Naval Civil Engineering Laboratory in Port Huenema, California. Samples were exposed at the open-circuit potential Bcorr and at - 850 mV vs SCE. The properties of the biofilms and the calcareous deposits were examined as a function of exposure time with electrochemical impedance spectroscopy (MIS) and SEM/EDAX. Comparisons will be made with the results for the stainless steels 304, 316 and Al6X and Ti grade 2 which have been exposed under identical conditions (1, 2, 3,). The effects of mass transport have been studied with a rotating cylinder electrode in laboratory experiments and in natural seawater. Current data were collected as a function of rotation speed at Bcorr, at - 850 mV vs SCE and at an anodic potential. Comparisons were made with the results for stainless steel 304 and Ti grade 2 which showed different effects of mass transport on the electrochemical reactions which determine the corrosion behavior of these materials. |  |   |  |  |  |
| 14. Subject Terms.<br>(U) Biofouling; (U) Corrosion; (U) Biodeterioration; (U) Electrochemistry   |  |   |  | 15. Number of Pages.   |  |
|   |  |   |  | 16. Price Code.  |  |
| 17. Security Classification of Report.<br>Unclassified  |  | 18. Security Classification of This Page.<br>Unclassified |  | 19. Security Classification of Abstract.<br>Unclassified   |  |
|   |  |   |  | 20. Limitation of Abstract.<br>SAR   |  |

Oct 22

Abstract No. 281

The Corrosion Behavior of Copper-Based Materials  
Exposed to Natural Seawater

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The corrosion behavior of Cu, Cu-Ni alloys, Admiralty Brass and Al Bronze has been studied as a function of exposure time to natural seawater at the Naval Civil Engineering Laboratory in Port Hueneme, California. Samples were exposed at the open-circuit potential  $E_{corr}$  and at  $-850$  mV vs SCE. The properties of the biofilms and the calcareous deposits were examined as a function of exposure time with electrochemical impedance spectroscopy (EIS) and SEM/EDAX. Comparisons will be made with the results for the stainless steels 304, 316 and Al6X and Ti grade 2 which have been exposed under identical conditions (1,2,3).

The effects of mass transport have been studied with a rotating cylinder electrode in laboratory experiments and in natural seawater. Current data were collected as a function of rotation speed at  $E_{corr}$ , at  $-850$  mV vs SCE and at an anodic potential. Comparisons were made with the results for stainless steel 304 and Ti grade 2 which showed different effects of mass transport on the electrochemical reactions which determine the corrosion behavior of these materials.

(1) F. Mansfeld, R. Tsai, H. Shih, B. Little, R. Ray and P. Wagner, "Results of Exposure of Stainless Steels and Titanium to Natural Seawater", Corrosion/90, paper No. 109

(2) F. Mansfeld, C.H. Tsai, H. Shih and B. Little, "An EIS Evaluation of Stainless Steel Exposed to Seawater", 175th Meeting of The Electrochemical Society, Los Angeles, CA, May 1989, paper No. 57

(3) F. Mansfeld, R. Tsai, H. Shih, B. Little, R. Ray and P. Wagner, "An Electrochemical Study of Stainless Steels and Titanium Exposed to Natural Seawater. I. Unpolarized Samples", submitted to Corr. Sci.

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| DTIC TAB           | <input checked="" type="checkbox"/> |
| Unannounced        | <input type="checkbox"/>            |
| Justification      |                                     |
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